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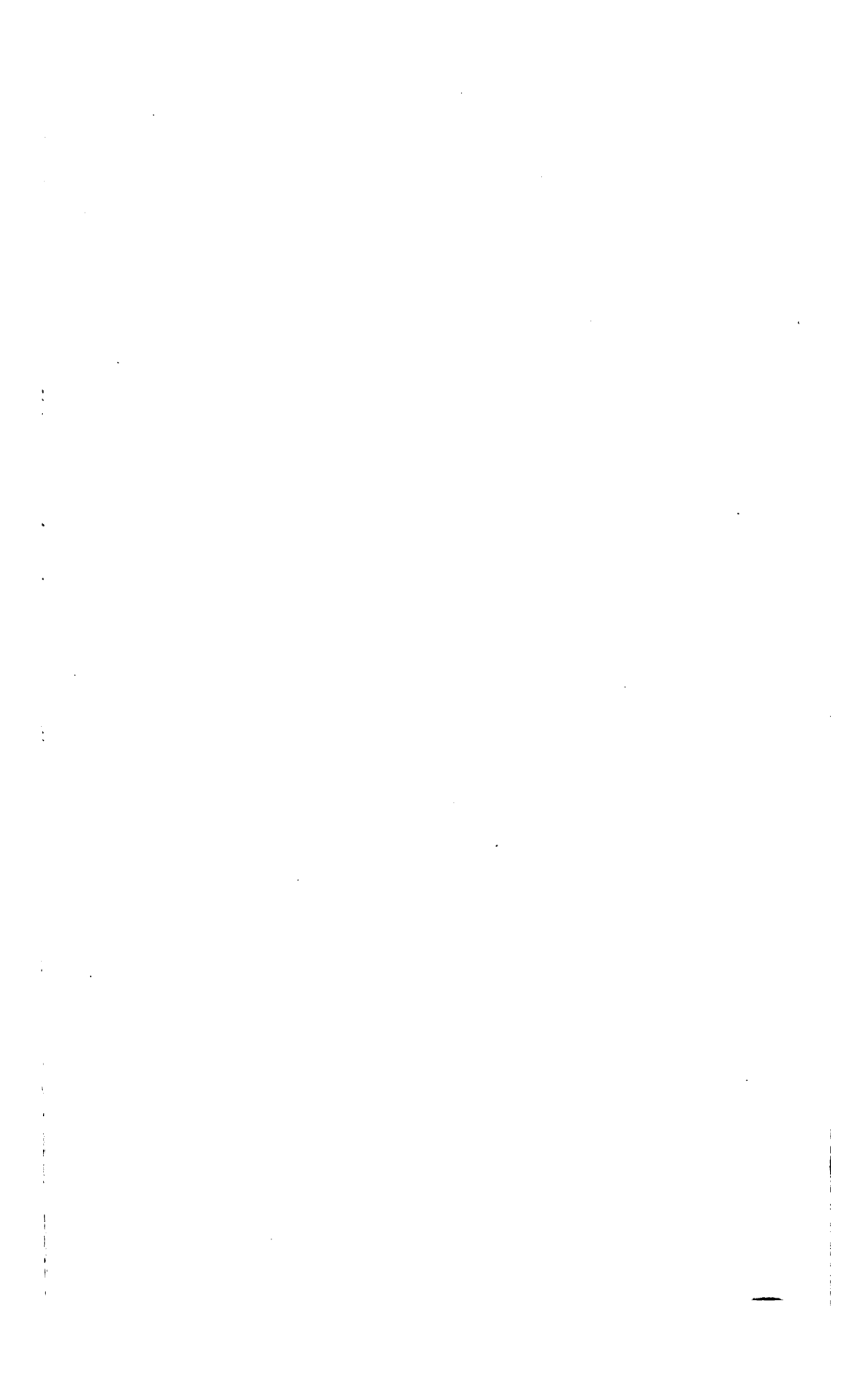
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June 15, 1927





A FEW REMARKS
ON THE
PRIMARY TREATMENT OF WOUNDS
RECEIVED IN BATTLE :

A REPORT
To the Surgeon-General of Massachusetts.

By GEORGE H. GAY, M.D.
SURGEON AT THE MASSACHUSETTS GENERAL HOSPITAL.

Re-printed from "The Boston Medical and Surgical Journal," by order of the Surgeon-General.



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A FEW REMARKS

ON THE PRIMARY TREATMENT OF WOUNDS

RECEIVED IN BATTLE.

BOSTON, OCTOBER, 1862.

To the Surgeon-General of Massachusetts.

DEAR SIR,—Allow me to present a few statements bearing particularly upon the surgical treatment of the wounded, which have been at different times suggested from actual observation, and by the reports of reliable persons and of soldiers.

It is well known that many of the sick have suffered through neglect and injudicious management that could not altogether be excused on the ground of some military necessity, and that vast numbers of the wounded have passed through prolonged suffering, and received needless mutilation in consequence of operations, not only inopportune as to the time of performance, unnecessary from the degree, extent or locality of the injury, but also ill-judged, mainly from an absence of that consideration which was due to the pressure and influence of surrounding circumstances.

PRIMARY TREATMENT.

The immediate treatment, the first dressings of gun-shot and other wounds, meaning thereby the application of water, bandages, plaster and lint, are of very great importance ; as at that time much may by a judicious course be accomplished and prevented, which at a later period may comparatively be of little avail. And, if some of these are improperly used, not only valuable time is lost to the soldier, but what was at first a trifling affair may be converted into a lingering and oftentimes dangerous sickness.

It may be generally stated, that this primary treatment should be as simple and easy to the patient as possible, as simple as the surrounding circumstances will allow.

WATER DRESSINGS.

The old dry dressing has been almost universally supplanted by the wet one, water alone, or with the addition of some other agent. So that, after a full examination of the wound and removal of the ball, clothing or any other remaining foreign substance, a compress of several folds of cloth, or a piece of spongio-piline, soaked in water and then squeezed so as not to drip, and placed upon and in the immediate vicinity of the wound, will almost always be found to be the most agreeable and beneficial application. It will be well sometimes to place a dry compress over the wet one, large enough to somewhat overlap it. Care should be taken that the compress is not too heavy, and that the temperature of the water should be regulated by circumstances. If the parts, where the shock has been great, and reaction is tardy and has not come on to a sufficient degree, are more or less cold and inactive, then the water should be tepid or warm, otherwise gangrene may be hastened where the vitality is too much lowered to bear the stimulus of the cold.

By a judicious management of these water dressings, the comfort of the patient is very essentially increased, by lessening irritation, inflammation and swelling. If the compresses become considerably heated, measures should be adopted to have the water renewed frequently. From neglect or other causes, the renewal of the water has been omitted, so that in many cases no change has been made for two, three or more days. In most instances, the patient himself, with proper directions, could apply the water. It will be seen from the above that stress has been laid upon fresh water only, especially because on the whole it will be found the most preferable and easily obtained, though sometimes it will be advantageous in some stages to use an aqueous solution of opium, laudanum, arnica, rum and water, and infusion of hops or poppies, or other agents.

There is no excuse for the additional pain and discomfort, from the dry, stiff, hard and wrinkled compress and bandage.

The bringing together of wounds immediately by adhesive plaster, over the spot of entrance and exit, is not advisable, and only in very exceptional cases will it be attended with good results. A few gun-shot wounds have looked as clean and almost as linear as pure incised wounds, and have united with the first dressing of plaster, without any discharge or sloughing.

EXPECTANT TREATMENT.

Many gun-shot and other wounds, if let alone, will take care of themselves, and by this is meant that there are certain processes to be

gone through with at the wound before cicatrization ; and all interference with nature must be avoided. She may be assisted in an individual case, but must not be opposed.

It is of great value to know when not to act, not to interfere, and when to do, and *how much* to do.

APPLICATION OF BANDAGES.

There can scarcely be a doubt that the expectant plan, in a great many traumatic lesions, will be followed with as favorable results as the same course in medical diseases.

Connected with the water or other dressings, is the bandage used to keep them in place. It is known that much additional suffering has been frequently caused by the bandage, either too tightly applied at first, or tightened by the subsequent swelling. Sufficient allowance has not been given for the swelling which comes on, at variable periods, after gun-shot or other wounds, of greater or less severity, sometimes almost immediately, sometimes not for hours or days, according to the degree, extent and locality of the injury, and the reactionary powers of the patient. The swelling may be confined to the superficial or deep portions of a locality, or to both at the same time. If the wound is superficial, the swelling is not generally great nor very painful ; but if the wound is deep, traversing a limb for instance, then the swelling involves the whole thickness of the limb, and is necessarily attended with more severe pain. The parts are tense and painful, from causes connected with the wound. If in this case a tight bandage is applied, as has been not unfrequently done, great needless suffering, irritation and inflammation are added. There has been altogether too much suffering of this kind. The soldier bears it as well as he can, supposing, of course, that it is wholly produced by the character of the wound.

The diversity of opinion, as to the question whether the wound should be enlarged by incision or not, may be traced to the circumstance of one surgeon finding relief occasionally in enlarging the original wound, where it and the swelling were merely superficial, while another surgeon has made an incision without any relief, because the swelling involved not only the superficial but deep regions. The external parts might have the painful tension removed by such an incision, but the benefit would not extend to the deep, swollen and constricted tissues.

To anticipate and avoid much of this unnecessary suffering, the bandage should be loosely applied, of just sufficient tightness to retain in place the necessary dressings. If a patient is to be removed any distance, and over a road where there will be much jolting, it must be applied more firmly, and full directions should be given to some one to examine and loosen it in some way, if there is an increase of suffering in consequence of the tightness.

LINT DRESSINGS.

The lint dressing particularly requires remarks in behalf of the wounded soldier. From what has been seen, and from the numerous complaints, it cannot be doubted that the abuse of this article has been very extensive, and to such a degree, that it would be more humane to altogether discard it, unless it can be employed with a much better judgment.

Too many wounds have had it rammed into them until they are tightly plugged, and then a tight bandage is applied over it, as if something more was needed to keep it in place. And all this has been done where there was no hæmorrhage, nor fear of any. It is not at all strange that the patient suffers greatly from this firm plug and additional constriction. Clothing, balls and any other foreign substance are removed from wounds as soon as can be, with the correct idea of withdrawing as much as possible every irritating cause; and yet the benefit from this action is immediately frustrated, for a new irritating substance is thrust in, and especial efforts are made to bind it there.

A clean, suppurating wound, perforating the cheek, has been seen, which had been stuffed several days with hard, dry lint, and which, on the removal of the lint, contracted one half in twenty-four hours. A colonel, with a wound of the sterno-mastoid muscle, also stuffed with lint, and so painful as to permit of but little motion of the neck, had almost instantaneous relief after the lint was removed and abandoned.

Many other cases were seen where the lint had become so adherent by the drying of the discharge about its edges as to require a long soaking with water and pulling before it could be detached, and this separation was followed by a free flow of the confined pus.

The lint arranged in cords, the size of lamp wick yarn, was also placed crosswise along the bottom of wounds, and then balls of coarse, dry lint pressed down upon them, all of which was removed when thought proper, by drawing upon the free ends of these cords, hanging loosely outside and near the wound.

Numerous other instances could be multiplied, sufficient to convince any one of the bad use to which this agent has been applied, and in such cases of course aggravating the suffering of the patient.

NEEDLESS OPERATIONS.

It is a matter of extended notoriety, that operations of different kinds have been performed, not only uncalled for by the nature, locality and extent of the injury, inopportune from the time of their performance, but also ill-judged from a disregard of all the concomitant circumstances which the case demanded.

To allude to no other, every surgeon will admit that a ligature of the carotid artery for a small, easily accessible wound of the edge of the tongue near its tip, was not only uncalled for but unjustifiable; the same may be said of an immediate amputation of the thigh for a wound of the popliteal artery, or the ligature of the principal artery of a limb for hæmorrhage a few hours after an amputation, or the excision of the greater portion of the shaft of the humerus or femur, upon the battle-field, or an important amputation before reaction had come on.

PROPER TIME FOR AMPUTATIONS.

Amputations, performed at an opportune time, may save a great many lives.

The mortality within a very short period after these operations has been large, owing in all probability not so much to the fact that an amputation has been done, but that it was attempted at a time when the system was the least able to bear it.

Amputations for injuries are less successful in their results, than for long-established diseases, because the system has received a serious shock, and has not constitutional force enough in some instances to bear up against it; the same result, and from the same cause, is seen in a less degree in the local death of the soft tissues and of bone, consequent upon injuries sufficient to produce that effect.

The military surgeon, however, must frequently act as circumstances dictate, and many limbs must be sacrificed, when more favorable auspices would justify and demand an effort to save them. If it is decided that an amputation is necessary, it must be done within a limited period, not too soon, while the system is still under the effect of the shock and before there are signs of increasing reaction, nor after inflammation and the so called irritative fever have become fairly established. The opportune time for an operation is surely not when the state of the system is very seriously reduced, in a collapsed or sinking condition, from the effect of the injury. Symptoms showing that the system is rallying from the effects of the shock, and manifest in the comparative strength of the pulse, and other general indications, must influence every one in making up the proper decision.

REACTION.

Ether particularly, and chloroform *under certain restrictions*, are valuable agents in assisting and accelerating the reactionary powers of the system. In many cases there will be no recovery from the shock, no reaction, and this of itself is an imperative reason for abstaining from any operative interference. If in this absence of suffi-

cient reaction, an operation of importance is performed, an unfavorable result is almost necessarily hastened.

The time of this reaction varies in different persons with the severity and locality of the injury, the degree of shock to the system, and the amount of reactionary power or vitality remaining. It may take hours, and even days. Therefore, because a primary operation, the one now alluded to, may be pronounced to be the proper one, it must not be supposed that even the so called primary amputation can be, or ought to be, performed *at any time* after the receipt of the injury. Safety to the patient demands that no operation of any magnitude should be attempted before there are signs of sufficient reaction, steady and not intermittent, nor after inflammation and the irritative fever are adding new trials to the patient's endurance.

It is true that sometimes amputations performed four, five or six days after the injury, and when the inflammation and fever are progressing, have ultimately been followed by recovery. But these cases are exceptional in their results, and may be explained by the fact that the powers of the system in individual instances have been ample enough to bear up, both against the effect of the injury and the additional shock of the operation at a very unfavorable period, but they should by no means be considered in any other light than an unsafe and dangerous practice.

EXSECTION OF BONES.

The *exsection* of portions of the *shaft* of bones, varying in extent from two to six or more inches, has been attended with very great fatality. An injury from any agent sufficient to produce great comminution and splitting of the bone, requires a long deliberation of all the attendant circumstances before resort should be had to such extensive exsection as has been done on the battle-field, or in a crowded depot for the wounded. The warning, which experience has given to every surgeon, in extensive and severe injuries of the soft tissues, never to operate too near the seat of the injury in apparently sound and healthy portions, on account of the gangrene which is almost sure to follow in the immediate region of the lesion, should tell us still more strongly to beware about an operation too near a shattered bone, for fear of gangrene, or necrosis, of one or both remaining portions of the shaft.

A piece of necrosed bone four inches long has been seen, that was removed from the humerus of a soldier, several months after an exsection. Forewarned, let an extra caution be prominent, for the *future* as well as the *present*.

It is difficult enough and often impossible, in severe injuries requiring amputation, to say where the line of demarcation is between the

skin that is sound and that about to die ; and we must, for many reasons, expect to find still greater difficulty in tracing or fixing this line in bone. The state of the system, the amount of constitutional force affected by the injury, shows itself after these operations by such diminished vitality in the neighborhood of the injury, that gangrene follows to a greater or less extent in the soft parts, and in the *bone also*, in many cases where it would be by no means anticipated.

Exsection, for injury, of any considerable portion of the shaft of a bone, particularly the thigh bone, would be considered a very serious operation in civil practice, even when the patient is under the best hygienic conditions, and when one can command every comfort and the most improved surgical appliances. In the field, or crowded temporary hospital, the operation must be invested with a still more serious and dangerous character, for a great many reasons, the controlling influence of which should not be under estimated.

And then again, as was said, how is one to know that, in the exsection, the saw passes through sound and not through deadened bone ? And we all know that the process of separation in necrosis is a tedious one, and with the suppuration from it and the soft parts is the liability to many troublesome complications.

Conservative surgery, within prudent limits, is valuable and praiseworthy, but an opprobrium when attempted in decidedly unfavorable circumstances. The *cui bono* of these extensive exsections is yet to be settled.

Then again, an operation, feasible upon the bones of the fore-arm or arm, might not be as feasible upon the thigh, or even the leg.

The exsection of the *articulations* in consequence of injuries, would probably be attended with more fatal results than the same operation for chronic disease, for the same reason that experience has shown that the ratio of mortality is greater in amputations after injury than after a long-established disease, because the system, besides the amputation, has the additional, serious and sudden shock from the injury. The unfavorable results that follow, may be traced more to the state in which the system is brought by the effect of the injury, than to the mere operation.

DRESSING OF STUMPS.

Let me add a word or two more in reference to the dressing of the stump after an amputation, which was accidentally omitted when allusion was made to the operation.

The following has been seen :—the flaps adjusted by sutures, then strips of plaster, then thick masses of dry, coarse lint, and over all a bandage. The line of approximation of the flaps was so much cover-

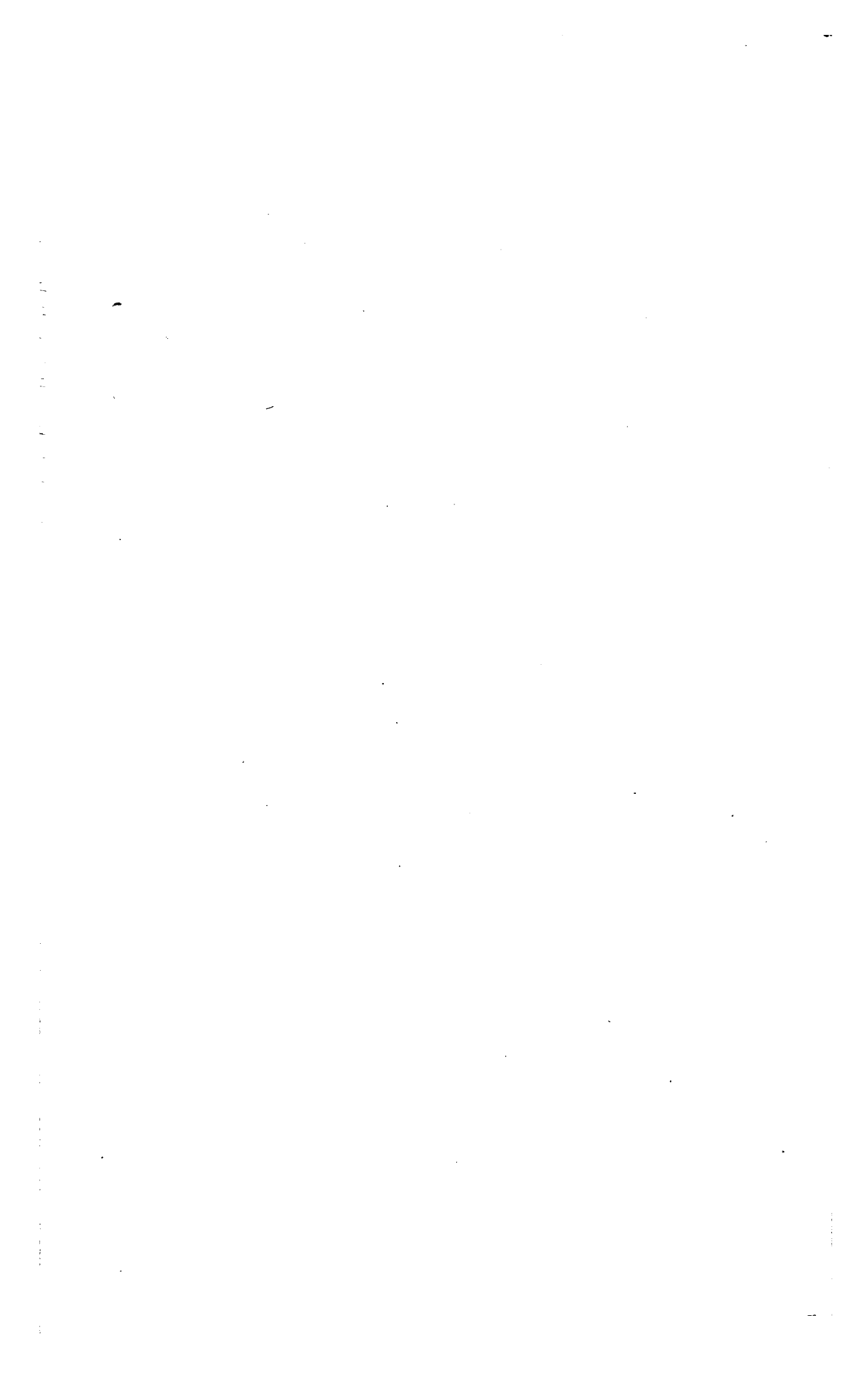
ed by the plaster as scarcely to admit of any exit to the secretions. The consequence was a swelling and pressure outward of the flaps by the pus confined internally. At the time of the renewal of the dressings, pressure was made to force out the remainder of the pus.

The danger of such a course is, of preventing union, by separating, and leaving a cavity between the flaps, and if the exit is not sufficiently free, for whatever is secreted within, then portions already united by granulations are separated by the pressure from distension, the support about the vessels is taken away, and the liability to subsequent hæmorrhage is very much increased.

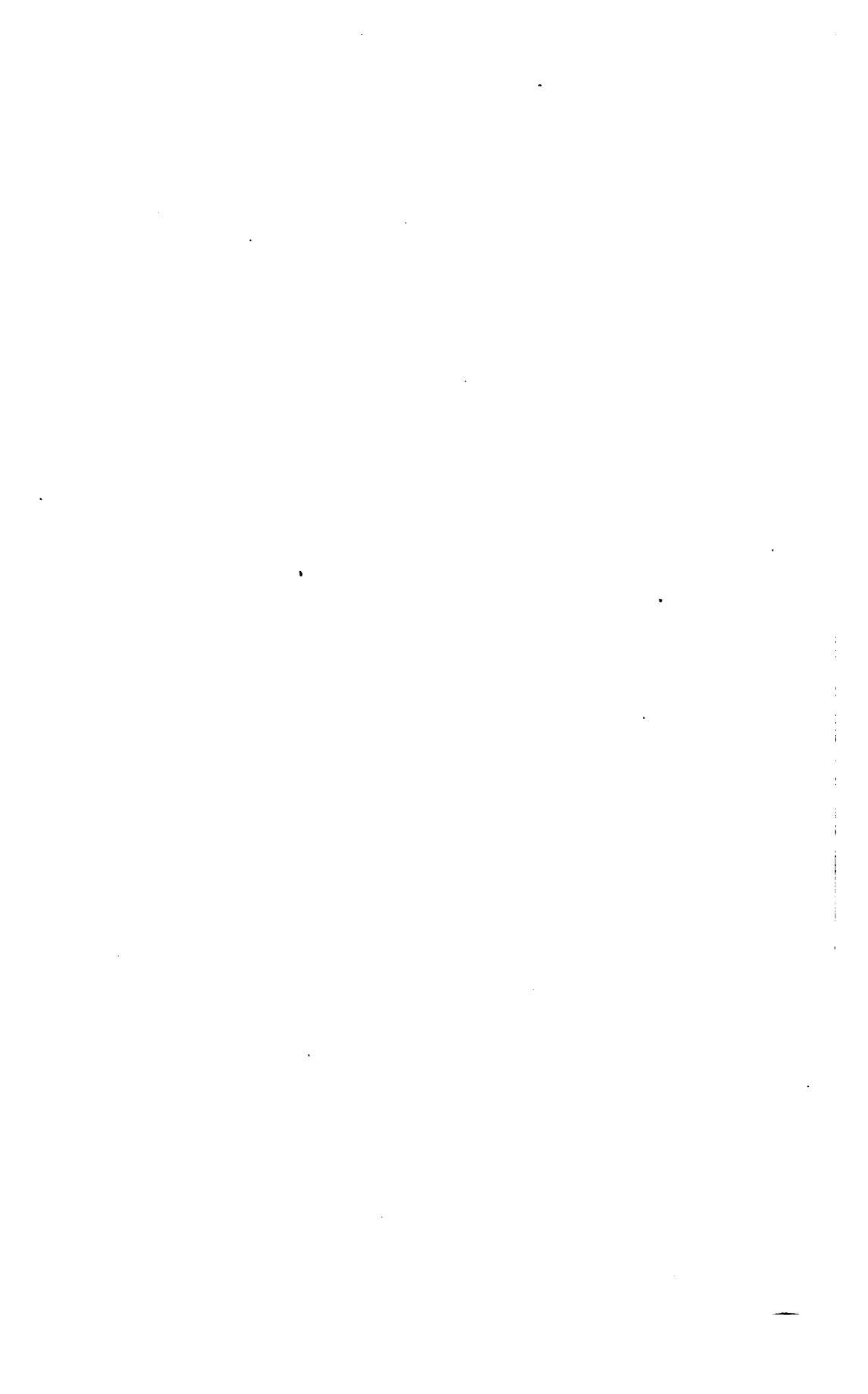
Time and safety are gained by letting the pus escape freely as fast as secreted, and only such a degree of compression should be used as will produce an easy and steady apposition of the parts, so that union may proceed with as little interference as possible.

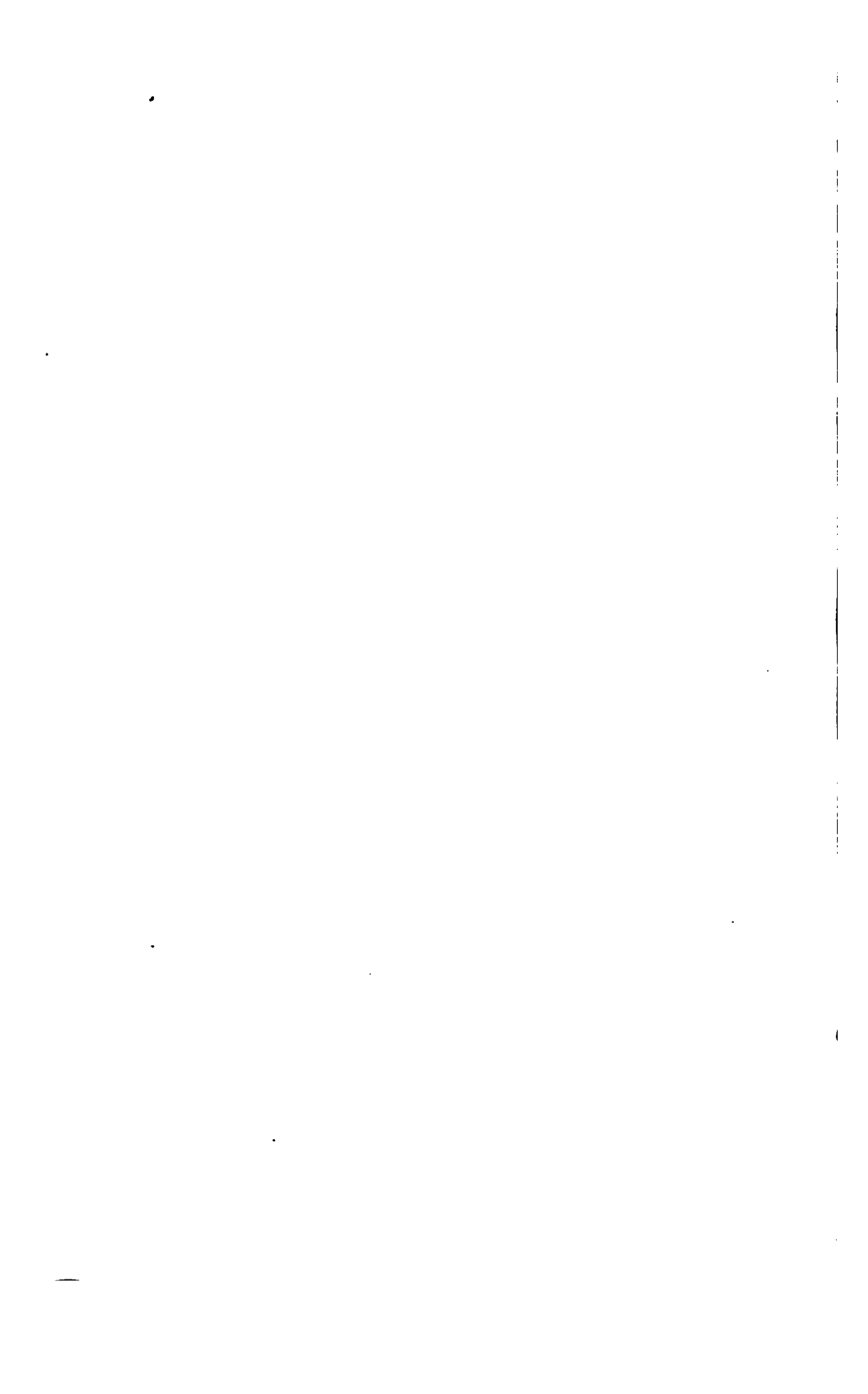
Lint, used as above, is not only heating and irritating, but it also adds an obstruction to the escape of the pus.

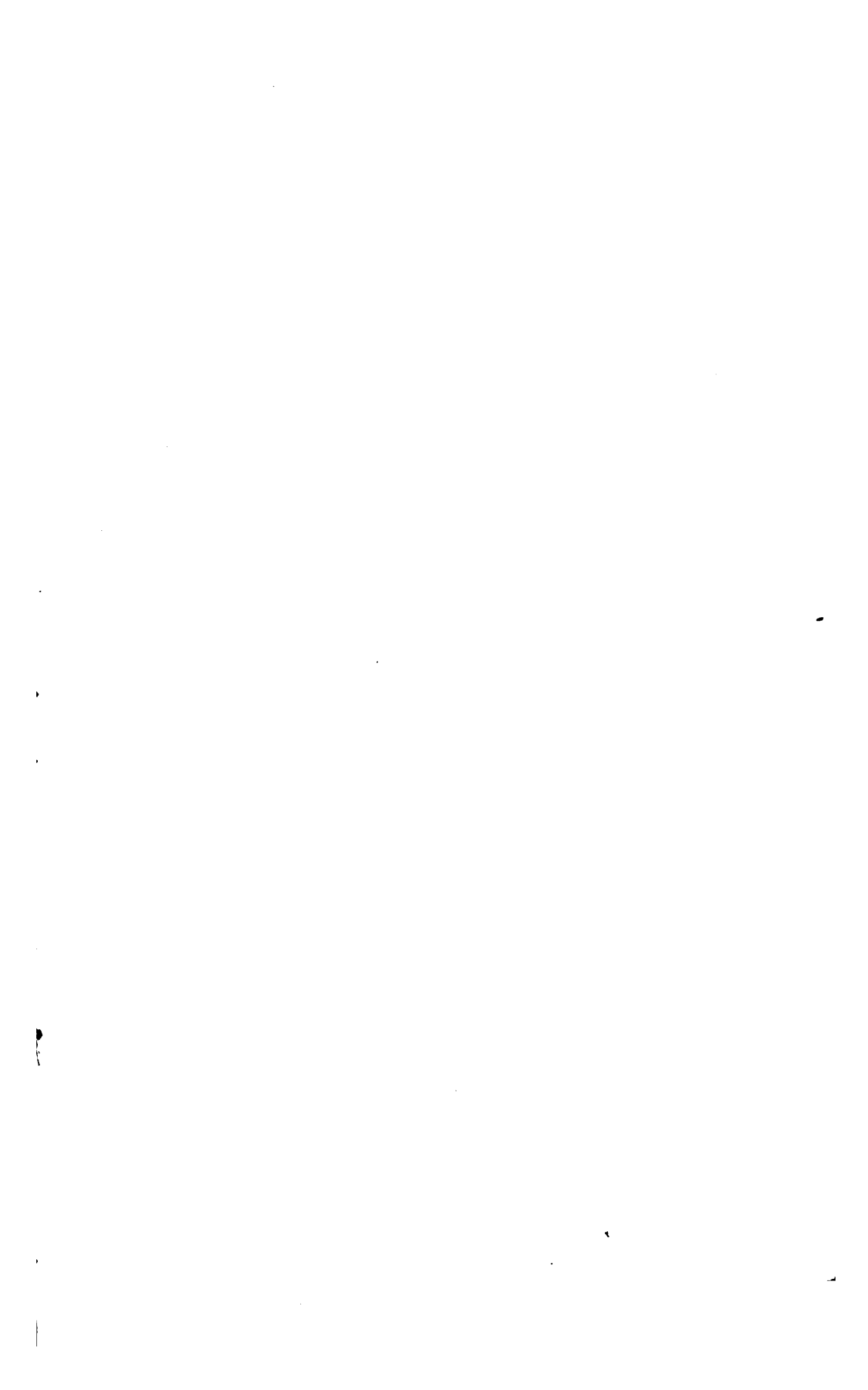
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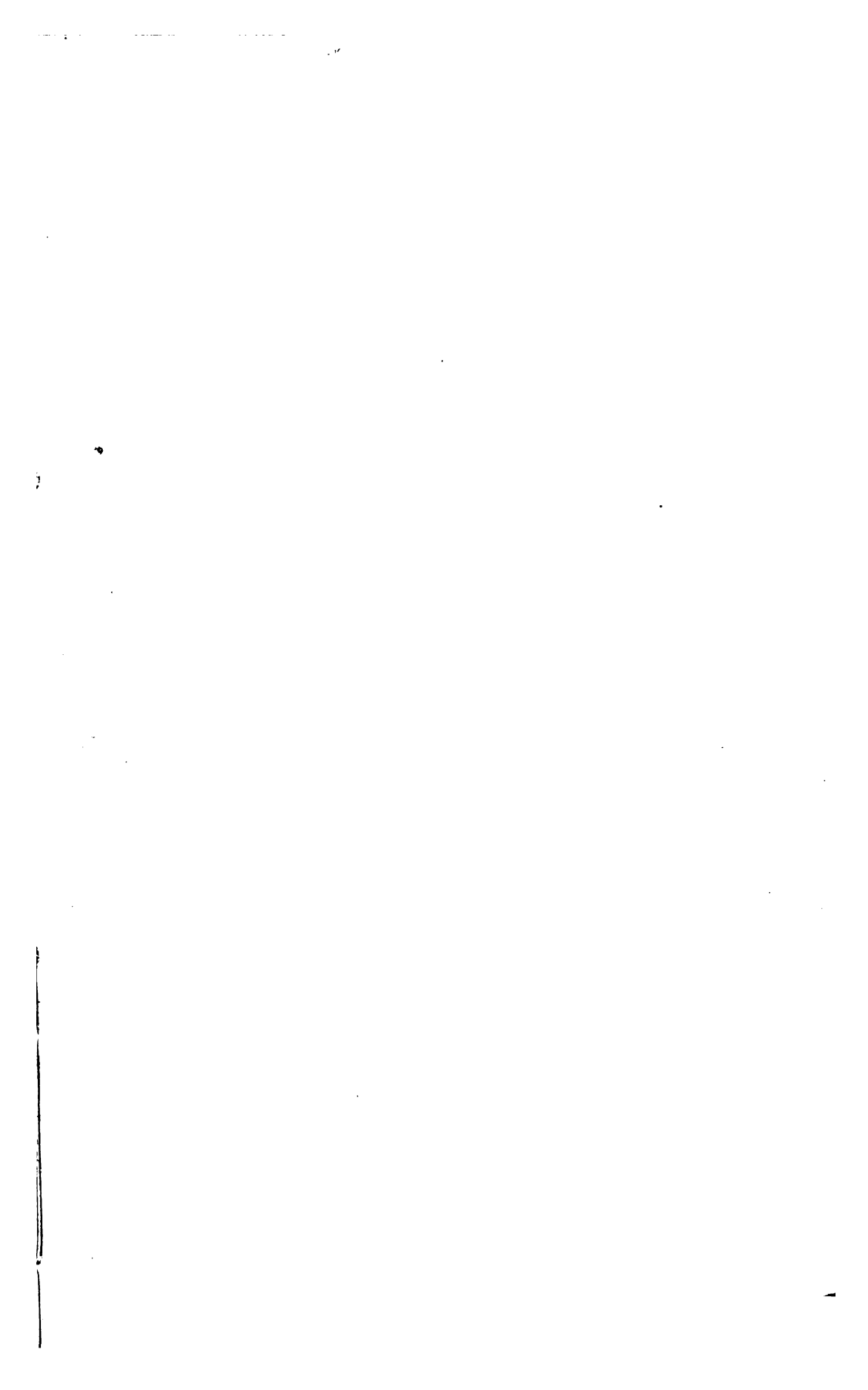


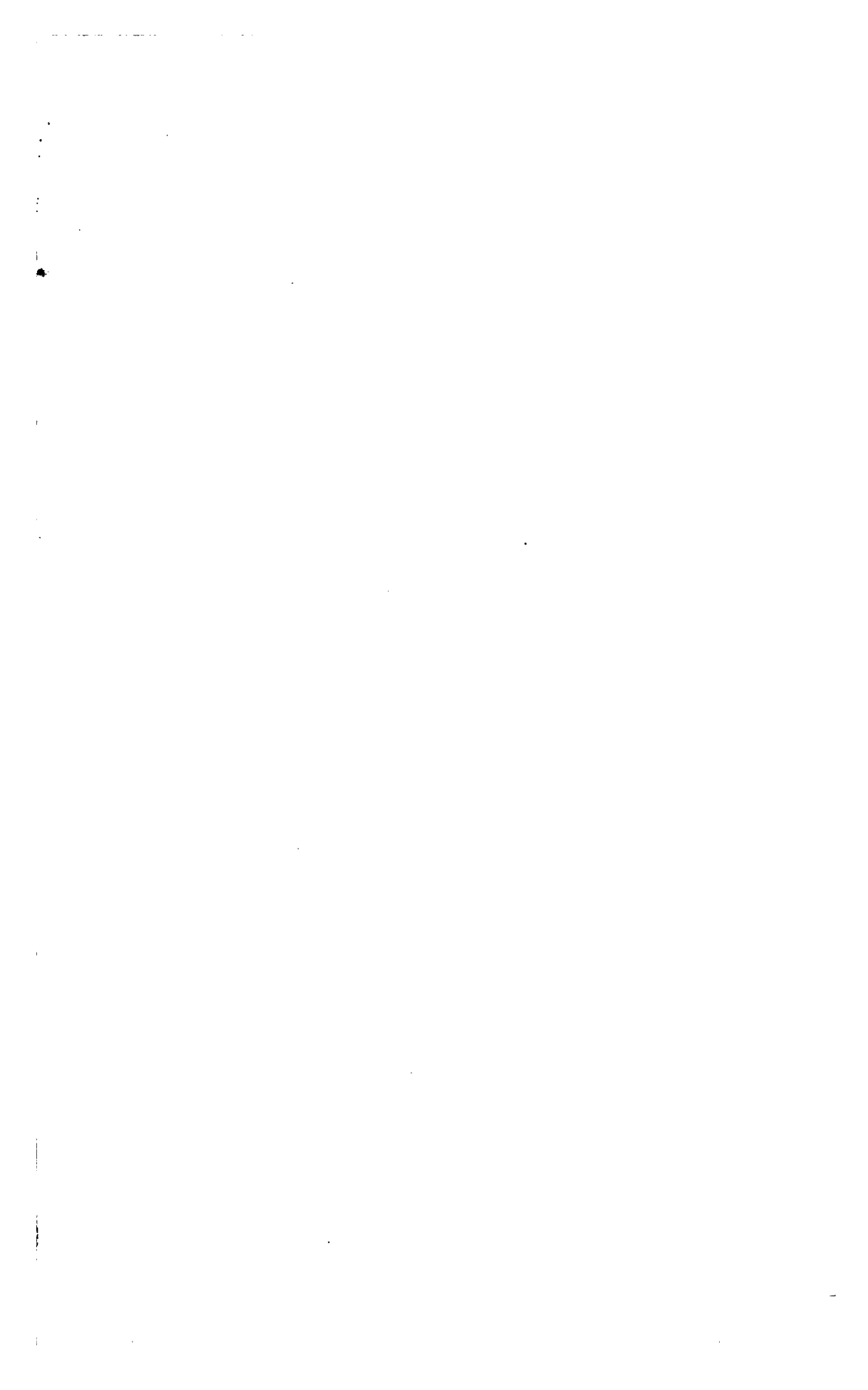


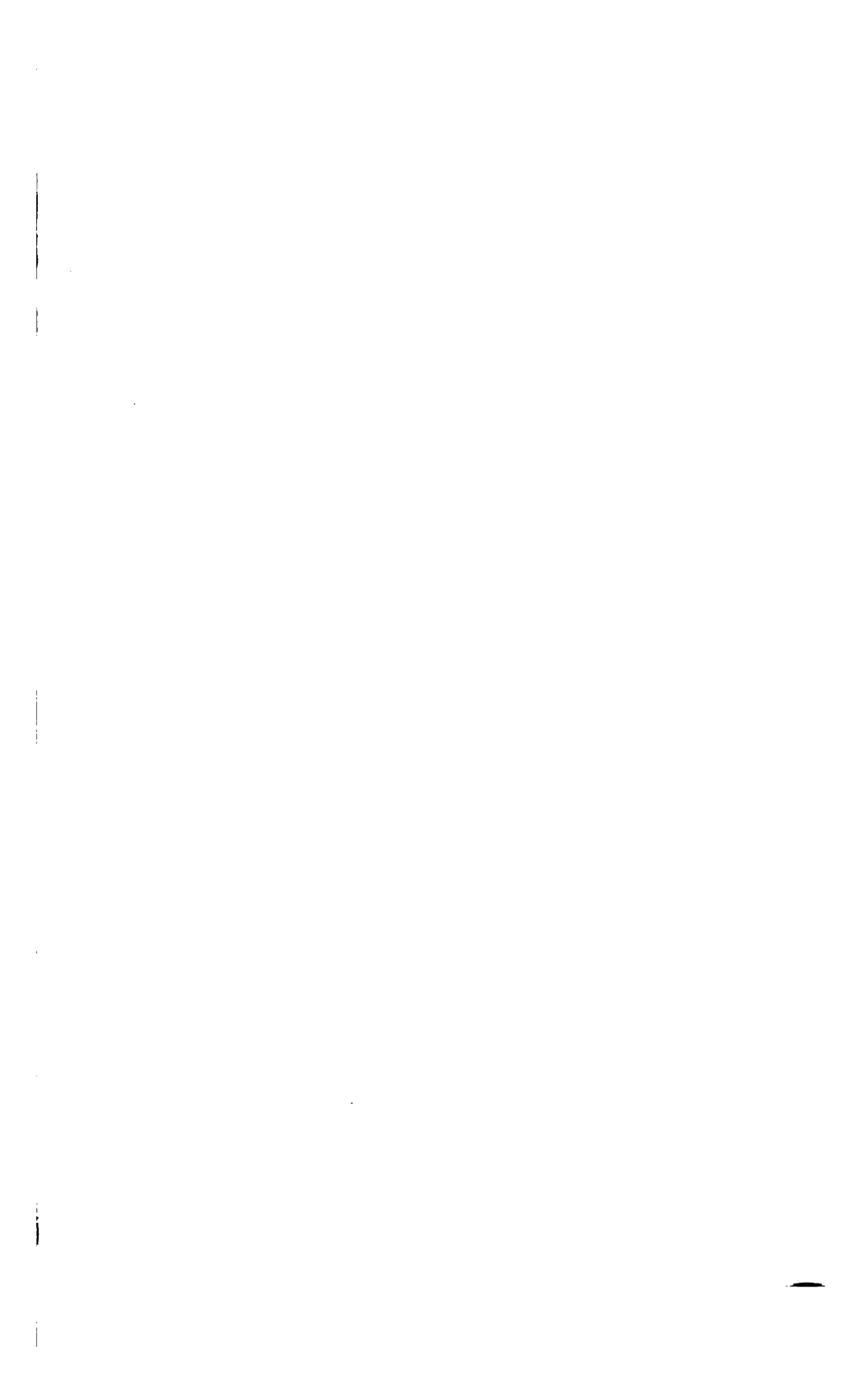






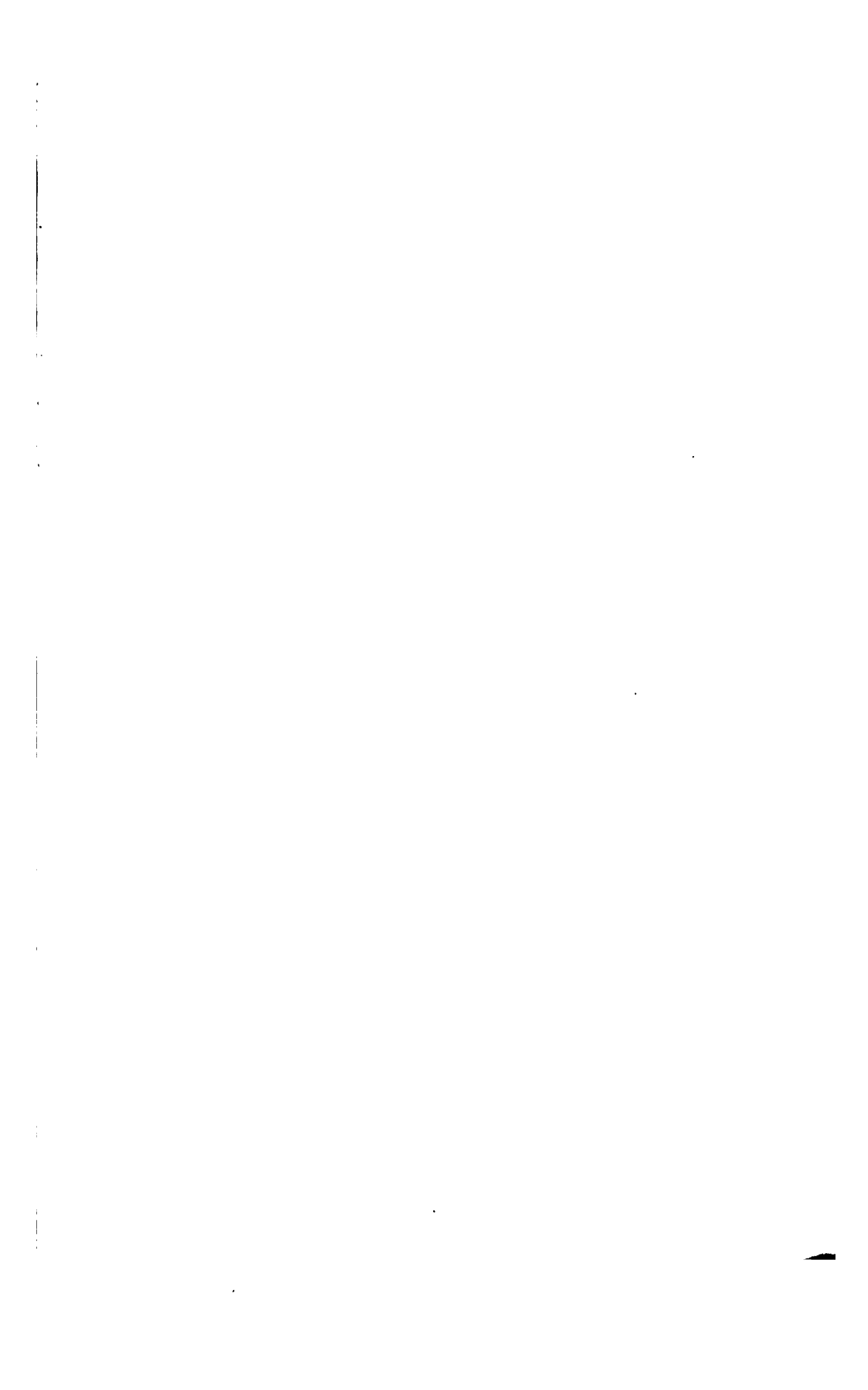




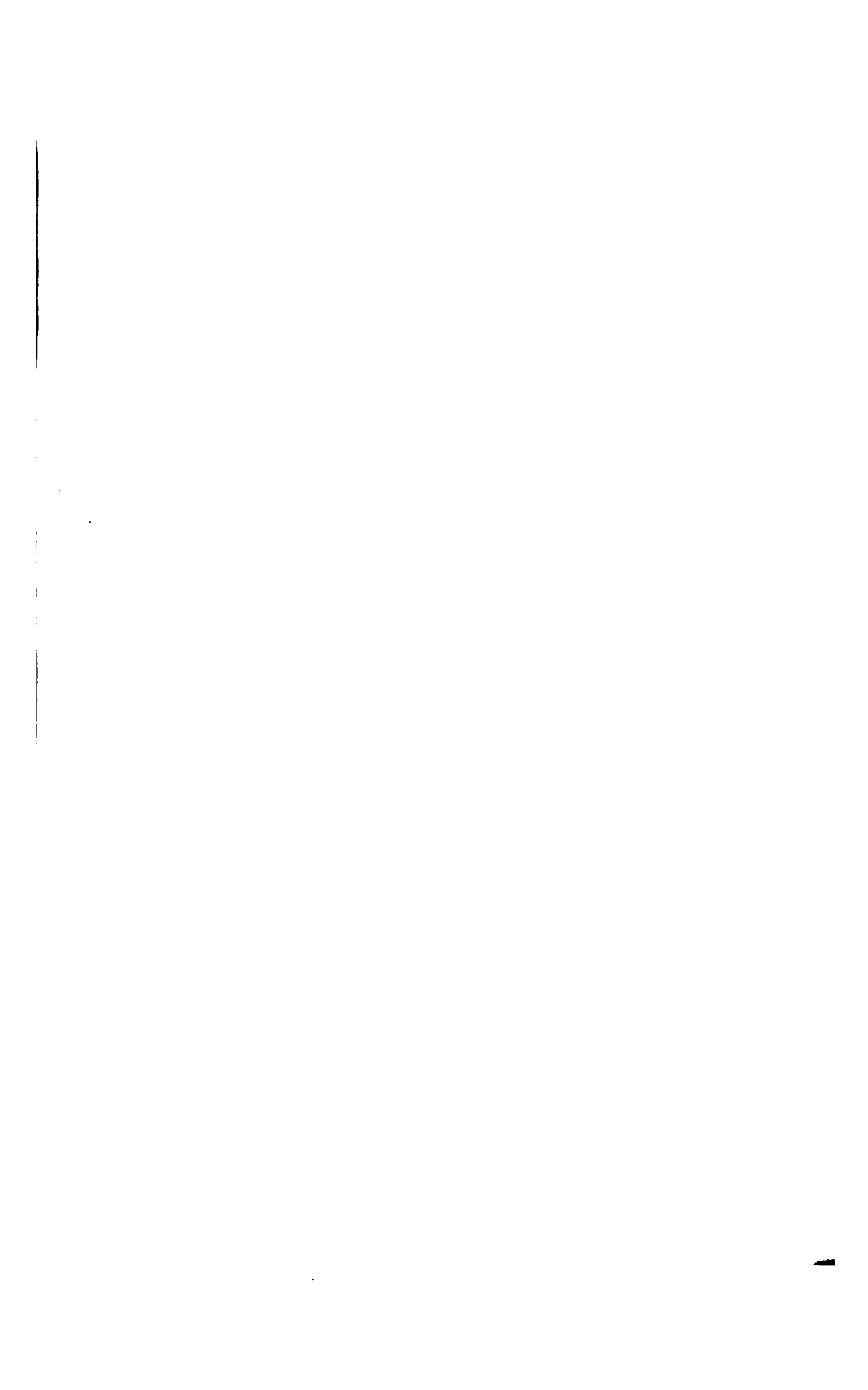


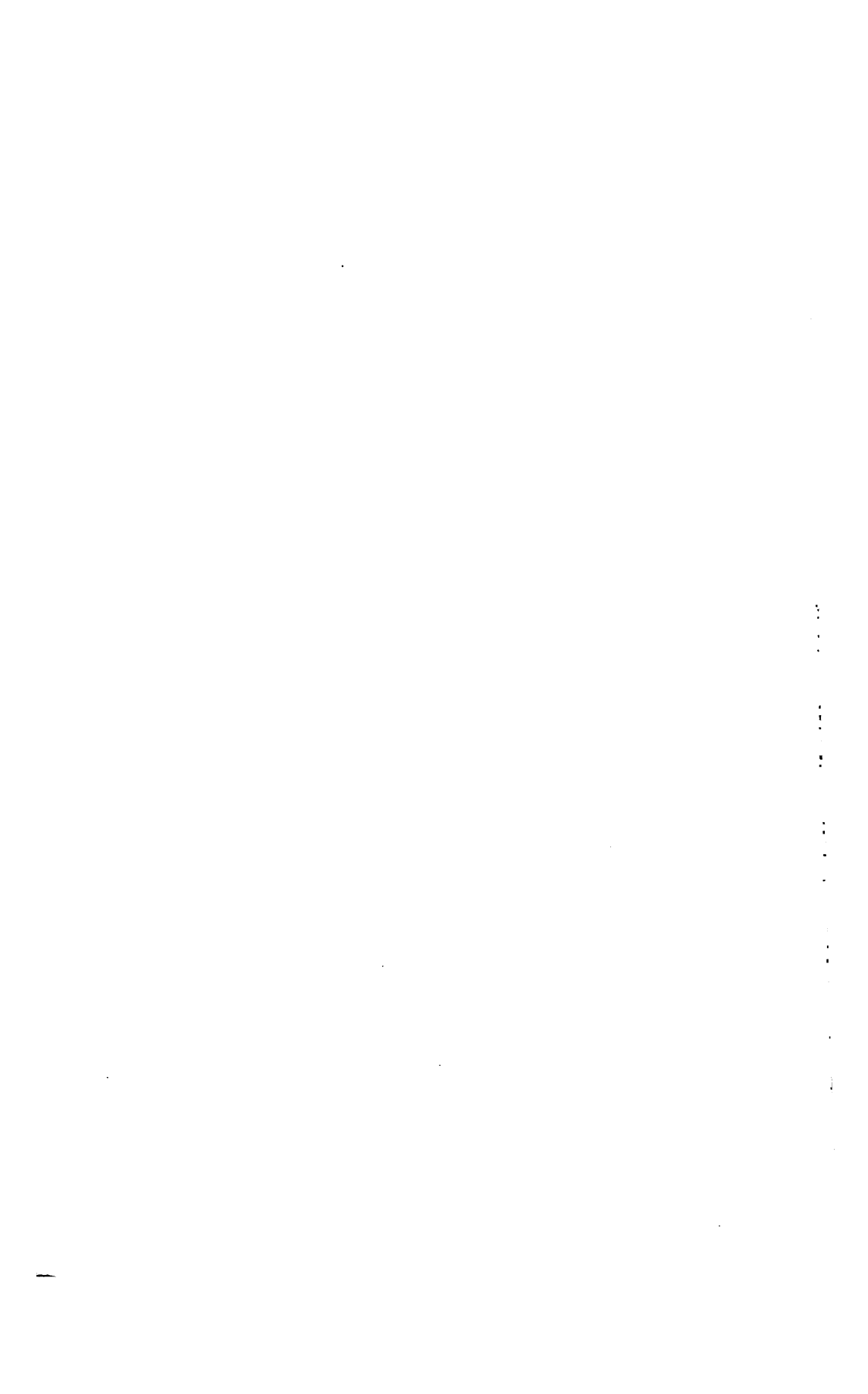


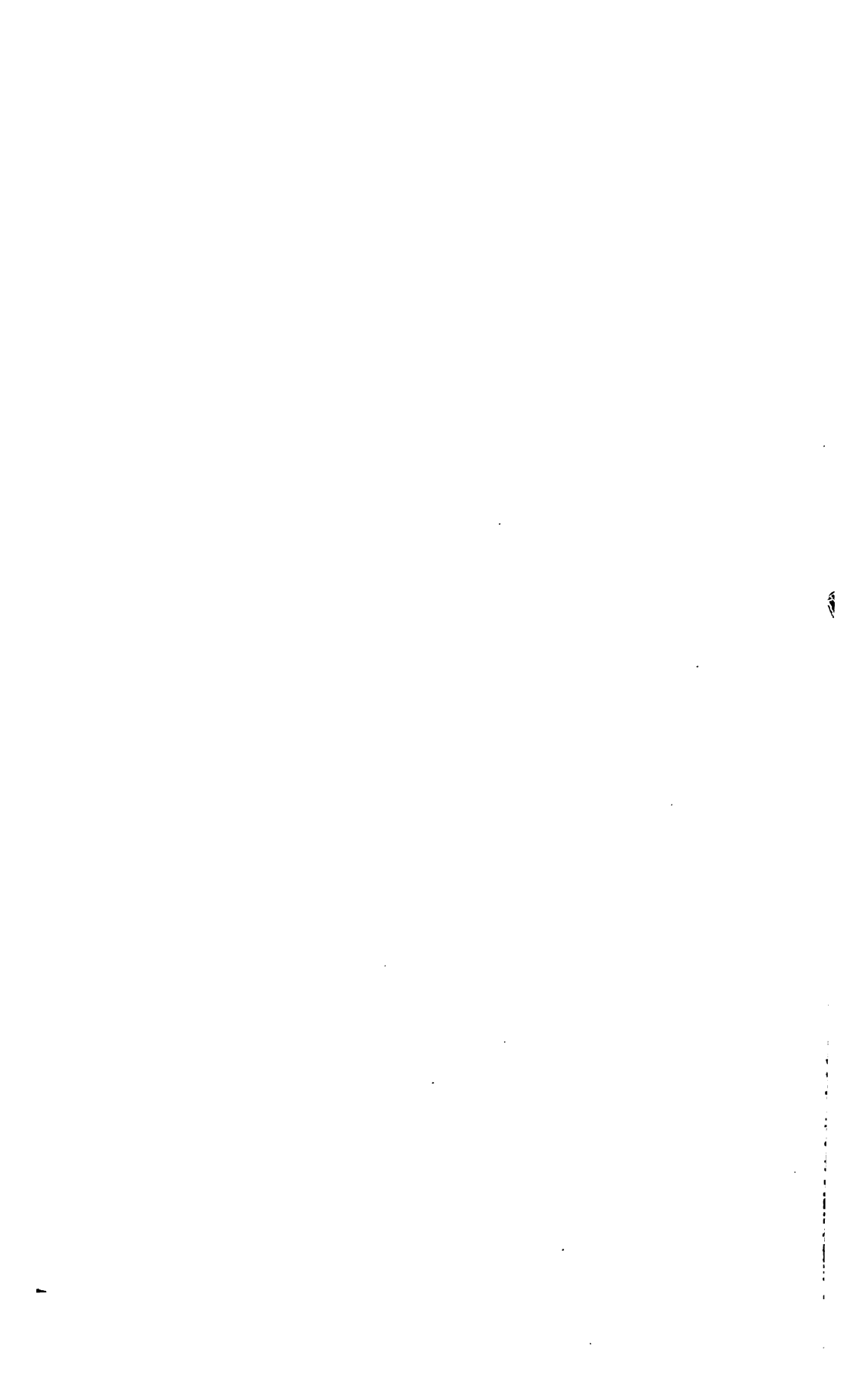












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